

Interim Runway Visual Range (RVR)/ Automated Surface Observing System (ASOS) Interface Regression Operational Test and Evaluation (OT&E) Report

William Benner
Michael McKinney

August 1998

DOT/FAA/CT-TN98/14

Document is on file at the William J. Hughes Technical Center
Library, Atlantic City International Airport, NJ 08405



U.S. Department of Transportation
Federal Aviation Administration

William J. Hughes Technical Center
Atlantic City International Airport, NJ 08405

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

DTIC QUALITY INSPECTED 3

19990209 076

te technical note tech

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents or use thereof.

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the objective of this report.

1. Report No. DOT/FAA/CT-TN98/14		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Interim Runway Visual Range (RVR) / Automated Surface Observing System (ASOS) Interface Operational Test and Evaluation (OT&E) Regression Report				5. Report Date August 1998	
				6. Performing Organization Code ACT-320	
7. Author(s) William Benner, Michael McKinney, Michael Jones, Raytheon Service Co.				8. Performing Organization Report No. DOT/FAA/CT-TN98/14	
9. Performing Organization Name and Address U.S. Department of Transportation Federal Aviation Administration William J. Hughes Technical Center Atlantic City International Airport, N.J. 08405				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
				13. Type of Report and Period Covered Technical Note	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Aviation Administration William J. Hughes Technical Center Atlantic City International Airport, N.J. 08405				14. Sponsoring Agency Code	
15. Supplementary Notes This effort was performed in cooperation with Federal Aviation Administration William J. Hughes Technical Center and project personnel from Raytheon Service Co. in Pleasantville, New Jersey.					
16. Abstract This report details results of a regression test performed on the Interim Runway Visual Range (RVR)/Automated Surface Observing System (ASOS) Interface. Testing was conducted from January 21 through 23, 1997, at Memphis International Airport (MEM). Testing was intended to determine if modifications to the interface corrected problems observed during initial testing October of 1996. Testing also was designed to determine if Interim RVR/ASOS software performance enhancements operated in accordance with user needs and functions. Problems observed during the initial test included the following: <ol style="list-style-type: none"> 1. ASOS Display Screen Mismatch with RVR product, 2. Interim RVR/ASOS Interface Boot Failure, 3. Interim RVR/ASOS Software Lock-Up, 4. New Generation RVR Output Rate and Interim RVR/ASOS Interface Software synchronization, 5. Phantom RVR products with RVR Configuration Modifications, and 6. False RVR products during RVR Sensor Calibration. <p>Of the problems discovered during initial testing, nine were resolved as a result of modifications to the Interim RVR/ASOS Interface and the ASOS. It was determined that a maintenance procedure could be used to correct the remaining problem.</p> <p>Correction and resolution of the problems identified during initial Operational Test and Evaluation (OT&E) indicate the Interim RVR/ASOS Interface and ASOS RVR functions are suitable for use in the field from an operational perspective. Proper performance demonstrated by the Interim RVR/ASOS Interface self-restart and illegal entry prevention features also indicate the Interim RVR/ASOS Interface can be used with a minimum of maintenance actions by field technicians. These developments suggest the Interim RVR/ASOS Interface is prepared for use at designated Long-Line RVR sites. As a result, ACT-320 recommends deployment of the interface at sites designated by the National Weather Service (NWS) and Federal Aviation Administration (FAA).</p>					
17. Key Words Interim RVR/ASOS Interface, External User port Application Data Unit, Watch-Dog Timer			18. Distribution Statement Document is on file at the Technical Center Library, Atlantic City International Airport, NJ 08405.		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 50	22. Price

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	v
1. INTRODUCTION	1
1.1 Purpose	1
1.2 Scope Of Report	1
1.3 Background	1
2. REFERENCE DOCUMENTS	3
3. SYSTEM DESCRIPTION	4
3.1 Mission Review	4
3.2 Test System Configuration	4
3.3 Interfaces	5
4. TEST DESCRIPTION	5
4.1 Test Schedule and Location	5
4.2 Participants	5
4.3 Test and Specialized Equipment	6
4.4 Test Objectives	7
4.5 Test Descriptions	8
4.6 Data Collection and Analysis Methods	18
5. OT&E REGRESSION TEST RESULTS	18
5.1 Simulated RVR to ASOS Test	18
5.2 Operational Procedure Test Part 1	19
5.3 Operational Procedure Test Part 2	21
5.4 Data Communication Failure Test	21
5.5 Extended Operation And Evaluation Test	23
6. CONCLUSIONS	23
7. RECOMMENDATIONS	24
8. ACRONYMS	25
APPENDIX	

LIST OF ILLUSTRATIONS

Figure		Page
3.3-1	RVR-ASOS ADU	5
4.5.1.2-1	Simulated RVR To ASOS Test Setup	9
4.5.2.2.1-1	Operational Procedure Test Setup	14
4.5.3.2-1	Data Communication Failure Test Setup	17

LIST OF TABLES

Table		
1	Script File RVRMSG3.DAT	10
2	Script File RVRMSG4.DAT	11
3	Script File RVRMSG5.DAT	11
4	Script File RVRMSG6.DAT	12
5	Script File RVRMSG7.DAT	12
6	RVR Product Generation Settings	16
7	Operational Procedure Test Output	22

EXECUTIVE SUMMARY

This report summarizes results of Operational Test and Evaluation (OT&E) Regression performed on the Interim Runway Visual Range (RVR)/Automated Surface Observing System (ASOS) Interface. Testing was conducted from January 21 through 23, 1997, at Memphis International Airport.

OT&E Regression was intended to determine if modifications to the Interim RVR/ASOS Interface corrected problems observed during initial OT&E in October of 1996. Testing was also intended to verify proper operation of Interim RVR/ASOS Interface software enhancements such as illegal data entry prevention, watch-dog timer, and auto-recovery from communication failure.

Problems observed during initial OT&E included the following:

- a. ASOS Display Screen Mismatch with RVR product,
- b. Interim RVR/ASOS Interface Boot Failure,
- c. Interim RVR/ASOS Software Lock-Up,
- d. New Generation RVR Output Rate and Interim RVR/ASOS Interface software synchronization,
- e. Phantom RVR products with RVR Configuration Modifications, and
- f. False RVR products during RVR Sensor Calibration.

Of the ten problems discovered during initial OT&E, nine were shown to be corrected as a result of software modification to the Interim RVR/ASOS Interface and ASOS. It was also determined that the remaining problem could be corrected with an additional maintenance procedure.

Correction and resolution of the problems identified during initial OT&E indicate that the Interim RVR/ASOS Interface and ASOS RVR functions are suitable for use in the field from an operational perspective. Proper performance of Interim RVR/ASOS Interface self-restart and illegal entry prevention features also indicate that the Interim RVR/ASOS Interface can be used with a minimum of maintenance actions by field technicians. These developments suggest the Interim RVR/ASOS Interface is prepared for use at designated long-line RVR sites. As a result, ACT-320 recommends deployment of the Interim RVR/ASOS Interface at locations designated by agreement between the Federal Aviation Administration (FAA) and National Weather Service (NWS).

1. INTRODUCTION.

This report will discuss results of Regression Operational Test and Evaluation (OT&E) performed on the Interim Runway Visual Range (RVR)/Automated Surface Observing System Interface (ASOS). With assistance from the National Weather Service (NWS), regression testing was conducted from January 21 through 23, 1997, at Memphis International Airport (MEM). Initial OT&E was conducted at the same location during October of 1996.

OT&E Regression tests consisted of a repeat of the tests performed during October 1996 and specific procedures designed to verify performance of the Interim RVR/ASOS Interface and ASOS as a result of modifications from the initial OT&E. For example, procedures were added to verify proper performance of the Interim RVR/ASOS Interface self-restart and boot sequence. Procedures were also included to verify proper operation in response to maintenance actions and configuration changes performed on the RVR system. All tests were performed in accordance with previously approved test plan and procedure documents¹. This report was developed in accordance with FAA-STD-024B and FAA-ORDER-1810.4B.

1.1 PURPOSE.

The purpose of this report is to discuss results of OT&E Regression activities performed on the Interim RVR/ASOS Interface at MEM.

1.2 SCOPE OF REPORT.

The report includes a summary of the problems encountered during OT&E regression testing, recommendations for resolution, and conclusions concerning deployment of the interface for use throughout the National Airspace System with New Generation RVR and the ASOS. A recap of problems encountered during initial OT&E and their status as a result of regression testing is also provided.

1.3 BACKGROUND.

An introduction to the New Generation RVR/ASOS Interface and ASOS is presented in the following subparagraphs.

¹ RVR/ASOS Interface OT&E Test Plan/Procedures dated 10/16 and 12/18 of 1996.

1.3.1 New Generation RVR/ASOS Interface.

As part of the NAS plan, the New Generation RVR was deployed and commissioned for use at U.S. airports (August 1994). However, the unavailability of several planned interfaces, including the RVR-ASOS Interface, prevented an OT&E of these components during New Generation RVR OT&E sessions.

Since March of 1996, the FAA has implemented development of a New Generation RVR interface to automatically transfer RVR information to ASOS. To reduce deployment time, the New Generation RVR/ASOS Interface has been implemented in two phases consisting of an Interim and Final phase.

For the Interim phase, a Hewlett Packard (HP) Palm-top Personal Computer (PC) with ASOS Application Data Unit (ADU) conversion software was planned to convert existing outputs of the New Generation RVR to a format recognizable to the ASOS. The interim phase is intended to provide immediate Long-Line RVR service to locations currently providing Long-Line RVR service by alternative methods.

The Final phase interface consists of an Intelligent Communications Controller Card (ICCC) which will reside in the New Generation RVR Data Processing Unit. Software modifications to RVR product processing modules are also required for the Final phase interface. The ICCC contains an EIA-530 interface which is compatible with the interface on the ASOS Acquisition Control Unit. ASOS ADUs will automatically output from the ICCC for direct ingestion on the ASOS.

1.3.2 Automated Surface Observing System (ASOS).

The ASOS utilizes sensors located on the airfield to measure weather parameters such as wind speed/direction, ambient temperature, and precipitation. Deployment of ASOS has permitted automatic dissemination of Surface Aviation Observation (SAO) format messages to various users such as airlines, pilots, and Flight Service Stations (FSS). Although the SAO could contain RVR products within the "remarks" section, the lack of an automated interface between the RVR system and ASOS resulted in the need for manual entry of RVR products to the SAO. The Interim RVR/ASOS Interface will eliminate manual entry of RVR products by providing a reliable interface for automatically transferring RVR products to ASOS.

As of July, 1, 1996, RVR products disseminated through ASOS will be reported as part of the METAR (Aviation Routine Weather Report) message, and the SAO message will no longer be used.

This will result in RVR products residing in the main portion of the report instead of the remarks section.

1.3.3 Initial Operational Test and Evaluation (OT&E).

Initial OT&E for the Interim RVR/ASOS Interface was conducted in October of 1996 at MEM. Although performance of the Interim RVR/ASOS Interface and ASOS were, in general, satisfactory, testing led to the discovery of 10 problems recorded as Test Trouble Reports (TTRs) (appendix A). Seven TTRs related to operation of the Interim RVR/ASOS Interface, two related to ASOS discrepancies, and one concerned the communication media which may be required at some deployment sites.

Software modifications were made to both the Interim RVR/ASOS Interface and ASOS to address the problems identified during testing. After completion of laboratory tests and the apparent correction to problems noted during initial OT&E, OT&E Regression tests were held from January 21 through 23, 1997, at MEM. Participants included representatives from the RVR Program Office (AND-520), NWS ASOS Program Office, NWS Network Software Branch (NSB), FAA William J. Hughes Technical Center (ACT-320), and FAA National Airway Systems (AOS-240). A summary of the tests performed, along with the results, conclusions and recommendations are provided in the following sections.

2. REFERENCE DOCUMENTS.

The following documents were used in preparation of this report:

FAA-STD-024B	Preparation of Test and Evaluation Documentation August 22, 1994
FAA-OR-1810.4B	FAA NAS Test and Evaluation Policy October 22, 1994
FAA-E-2772	FAA RVR System Specification
TEST PLAN	New Generation Runway Visual Range Automated Surface Observing System Interface OT&E Test Plan, October 16, 1996
50-SANW-1-00050	Appendix XII Interface Control Document (ICD) Runway Visual Range System to Automated Surface Observing System (ASOS), May 30, 1991

3. SYSTEM DESCRIPTION.

This section provides a mission review summary for the New Generation RVR and a brief description of the test system configuration for the Interim RVR/ASOS Interface and ASOS.

3.1 MISSION REVIEW.

The New Generation RVR system is designed to provide measurement of runway visibility at specific points along a precision runway. The system supports instrument landings during Category I, II, IIIa/b visibility conditions as defined in specification FAA-E-2772. To provide RVR data, the system determines the following parameters:

- a. Ambient light intensity,
- b. Atmospheric scattering coefficient, and
- c. Runway centerline/edge light intensity.

The system processes this data to output distances a pilot could expect to see along the departure or approach path of the runway. The New Generation RVR system is designed to decrease the maintenance load and installation difficulties associated with predecessor runway visual range systems. Future expansion capabilities will be easier and less costly.

3.2 TEST SYSTEM CONFIGURATION.

The Interim RVR/ASOS Interface consisted of a Hewlett Packard (HP) 200 LX Palmtop computer with customized software designed to facilitate ASOS data conversion and transmission. The HP Palmtop utilized DOS version 5.0, internal RAM and data storage, and a 5-megabyte (MB) Personal Computer Memory Card International Association (PCMCIA) memory card which functioned similar to a standard PC floppy disk.

Through a split RS-232 serial cable, the HP Palmtop was connected to the New Generation RVR Data Processing Unit's External User port, and to an RS-232 to EIA-530 signal level converter. The split cable permitted the HP Palmtop to receive raw RVR data and transmit ASOS ADUs from the same HP Palmtop port. The RS-232 to EIA-530 level converter enabled HP Palmtop outputs to be compatible with a serial port on the ASOS ACU.

In addition to the HP Palmtop PC, the Test System Configuration consisted of an operational New Generation RVR configured with National Deployment Baseline software (version 1) and the ASOS configured with software version 2.45.

3.3 INTERFACES.

The Interim RVR/ASOS Interface utilized the New Generation RVR External User Interface to receive unprocessed RVR data. After processing, the HP Palmtop's customized RVR-ASOS software enabled one-way transmission of ADUs to ASOS consisting of the format shown in figure 3.3-1. The ADU was transferred to the ASOS ACU at a rate of twice per minute.

Time Stamp	Runway ID	Runway Sub ID	RVR Product
------------	-----------	---------------	-------------

FIGURE 3.3-1. RVR-ASOS ADU

The Data Processing Unit Maintenance Data Terminal (MDT) interface was used throughout testing to monitor and control New Generation RVR parameters and functions throughout testing. A local ASOS ACU interface permitted use of an Operator Information Display (OID) to monitor all RVR-related display screens on ASOS. The OID also permitted direct control of the ASOS throughout testing.

4. TEST DESCRIPTION.

This section describes participants involved in test sessions, equipment required for testing, and RVR/ASOS Interface OT&E tests.

4.1 TEST SCHEDULE AND LOCATION.

Interim RVR/ASOS Interface tests were conducted from January 21, through 23, 1997, at MEM. Preliminary tests in preparation for Regression OT&E were also conducted at the William J. Hughes Technical Center during November and December of 1996.

4.2 PARTICIPANTS.

Participants and their respective roles during OT&E included the following organizations:

- a. National Weather Service (NWS). NWS representatives coordinated OT&E through obtaining approvals from local and regional representatives. The NWS assisted in the conduct of OT&E by providing technical support, test equipment, and operators for the ASOS. NWS representatives included personnel from the ASOS program office and the National Oceanic Atmospheric Association (NOAA).
- b. FAA Aeronautical Center. The FAA Aeronautical Center provided technical support for the New Generation RVR System during testing, assisted in the installation activities, and assisted with test conduct.
- c. RVR Program Office. The RVR Program Office coordinated the OT&E effort by obtaining approvals from regional and local FAA representatives. The Program Office also assisted in the resolution of test procedure issues and test conduct.
- d. William J. Hughes Technical Center. William J. Hughes Technical Center representatives assisted in installation activities, resolved coordination issues with MEM airport personnel, conducted OT&E tests, and functioned as Test Director for OT&E. Technical Center representatives also assisted the RVR program office in OT&E coordination.
- e. Memphis Airport. Memphis Airport representatives provided official on-site support for access to New Generation RVR and ASOS equipment and related facilities. Memphis Airport personnel also provided on-site resources required for testing.

4.3 TEST AND SPECIALIZED EQUIPMENT.

The following equipment test and analysis tools were used during OT&E testing:

- a. PC-based RVR simulator,
- b. Protocol analyzer,
- c. Null Modem Adapter,
- d. Data Communication Fault Simulator (DCFS), and
- e. Data transmission devices.

4.3.1 PC Based RVR Simulator.

To simulate Interim RVR/ASOS Interface output, a PC-based RVR simulator or ASOS ADU generator was used. The simulator operated by using script files consisting of preprogrammed RVR products

and runway identifiers. The simulator's data transmission rate was configured to match the Interim RVR/ASOS Interface of 2x/minute.

4.3.2 Protocol Analyzer.

To capture all data transmitted to ASOS, monitor handshaking, and verify status of the communications link, protocol analyzers were used during all OT&E tests. The NETLENS 3000 analyzer was used during testing to accomplish these tasks.

4.3.3 Null Modem Adapter.

To facilitate communication between the Interim RVR/ASOS Interface and ASOS, an EIA-530 Null Modem Adapter was required. The adapter enabled communication from the New Generation RVR port configured as Data Communication Equipment (DCE) to the ASOS DCE port without use of a modem.

4.3.4 Data Communication Fault Simulator.

Data communication faults and errors between the Interim RVR/ASOS Interface and ASOS were created through the use of a function in the customized HP Palmtop software. The software tool simulated communication problems including parity mismatch and invalid block check codes during data transmissions between the Interim RVR/ASOS Interface and ASOS.

4.3.5 Data Transmission Devices.

Due to the small distance and associated cable length required between the New Generation RVR Data Processing Unit (DPU) and ASOS Acquisition Control Unit (ACU); i.e., approximately 8 feet, no data transmission devices were needed to facilitate data communication.

4.4 TEST OBJECTIVES.

Regression testing was designed to verify whether Interim RVR/ASOS Interface operation was in compliance with specifications 50-SANW-00050 and FAA-E-2772. Testing was also intended to determine if performance degradation existed on the New Generation RVR and ASOS as a result of Interim RVR/ASOS Interface operation. Specific objectives for each test category are provided in the Test Descriptions, section 4.5.

4.5 TEST DESCRIPTIONS.

Four test categories were performed on the New Generation RVR, Interim RVR/ASOS Interface and ASOS. The tests are identified as follows and described further in the following subparagraphs:

- a. Simulated RVR to ASOS Test,
- b. Operational Procedure Test,
- c. Data Communication Failure Test, and
- d. Extended Operation and Evaluation Test.

4.5.1 Simulated RVR to ASOS Test.

The Simulated RVR to ASOS Test was the first test performed during regression OT&E. This test featured use of a PC-based ASOS ADU generator which replicated Interim RVR/ASOS Interface output functionally by sending ASOS ADUs to the ASOS ACU. The ADU generator was programmed to transmit a range of RVR products, e.g., 100 feet to 6500 feet, usually with a different product transmitted each minute, and function continuously without operator intervention.

ADU generator RVR products were transmitted at the same rate, i.e., 2x/minute, as from the Interim RVR/ASOS Interface. Non-numeric and illegal RVR products such as "FFF", " ", and "(+" were also transmitted from the ADU generator. The ASOS was configured to display RVR products as they were received. The test focused on verifying whether RVR products displayed on the ASOS display matched transmitted ADU products. The ADU generator transmitted RVR products for approximately 3 hours under control of several script files. Paragraph 4.5.1.2 discusses the intent of each script file used during testing.

4.5.1.1 Simulated RVR to ASOS Test Objectives.

The objective of the Simulated RVR to ASOS Test was to verify proper operation of ASOS RVR functions implemented in software version 2.45.

4.5.1.2 Simulated RVR to ASOS Test Setup.

The ASOS ADU generator was connected to ASOS as shown in figure 4.5.1.2-1. ASOS was initialized with its operational software during test setup.

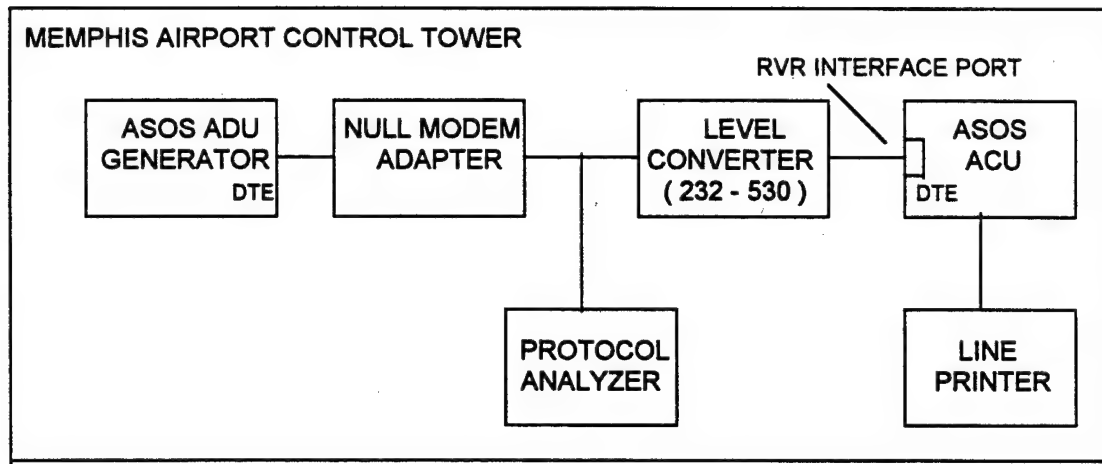


FIGURE 4.5.1.2-1. SIMULATED RVR TO ASOS TEST SETUP

4.5.1.2.1 ADU Generator Script Files.

Script files identified in paragraphs 4.5.1.2.1.1 through 4.5.1.2.1.5 were used to output "canned" or preprogrammed RVR products during the Simulated RVR to ASOS Test. File contents are listed in Table 1 to Table 4. A brief discussion of the script file precedes each table.

For each table, the row labeled with RWYID represents the runway identifier included in each RVR product transmitted. The PROD# column identifies the order of the product transmitted. The column labeled VALUE contains the actual RVR product transmitted. The ADU generator was configured to repeat the script file output sequence immediately after transmission of the last product in the file. For example, in table 3, PROD# 1 was transmitted after PROD# 60.

4.5.1.2.1.1 Rvrmsg3.dat.

Rvrmsg3.Dat was designed specifically to verify whether ASOS "specials" or detection of significant weather parameter changes, were properly generated in response to RVR product variations.

Since ASOS processing software was designed to generate an RVR special when the RVR product crossed 2400 feet (in both directions), typical RVR product values on each side of the 2400-foot threshold were included in RVRMSG3.DAT to test this design

function. An additional requirement for the ASOS special was that the RVR product must remain above/below the threshold for at least 10 minutes. This was accounted for in the RVRMSG3.DAT file by including 10 minutes or at least 20 RVR product readings above and below 2400 ft. FFF products were included at the end of the script file sequence to verify whether the occurrence of a series of non-numeric products would prevent proper detection and notification of a RVR weather special. To determine if an RVR special was generated when RVR readings increased past the 2400-foot threshold, the RVRMSG3.DAT file contained an RVR product sequence where a series of 2200-foot RVR readings (represented by the number 22) changed to a series of 2600-foot readings (represented by the number 26).

TABLE 1. SCRIPT FILE RVRMSG3.DAT

RWYID	02L								
PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE
1	22	13	22	25	26	37	26	49	FFF
2	22	14	22	26	26	38	26	50	FFF
3	22	15	22	27	26	39	26	51	FFF
4	22	16	22	28	26	40	26	52	FFF
5	22	17	22	29	26	41	FFF	53	FFF
6	22	18	22	30	26	42	FFF	54	FFF
7	22	19	22	31	26	43	FFF	55	FFF
8	22	20	22	32	26	44	FFF	56	FFF
9	22	21	26	33	26	45	FFF	57	FFF
10	22	22	26	34	26	46	FFF	58	FFF
11	22	23	26	35	26	47	FFF	59	FFF
12	22	24	26	36	26	48	FFF	60	FFF

4.5.1.2.1.2 Rvrmsg4.dat.

Rvrmsg4.Dat was designed with the same general intent as Rvrmsg3.Dat, but was specifically intended to verify generation of an ASOS RVR special in response to a decrease in RVR readings through the 2400-foot threshold. As a result, the RVR product sequence contained the transition from a series of 2600-foot products to a series of 2200-foot products.

TABLE 2. SCRIPT FILE RVRMSG4.DAT

RWYID	02L								
PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE
1	26	13	26	25	22	37	22	49	FFF
2	26	14	26	26	22	38	22	50	FFF
3	26	15	26	27	22	39	22	51	FFF
4	26	16	26	28	22	40	22	52	FFF
5	26	17	26	29	22	41	FFF	53	FFF
6	26	18	26	30	22	42	FFF	54	FFF
7	26	19	26	31	22	43	FFF	55	FFF
8	26	20	26	32	22	44	FFF	56	FFF
9	26	21	22	33	22	45	FFF	57	FFF
10	26	22	22	34	22	46	FFF	58	FFF
11	26	23	22	35	22	47	FFF	59	FFF
12	26	24	22	36	22	48	FFF	60	FFF

4.5.1.2.1.3 Rvrmsg5.dat.

Rvrmsg5.Dat was intended to verify proper ASOS reception and display of non-numeric RVR products such as " ", FFF, and 60+. Additionally, the file was configured to verify generation of an RVR special by including a transition from products below and above 2400 feet. This file was also intended to verify proper reception and display of a runway identifier, "36", without letter designation, i.e., L, R, C.

TABLE 3. SCRIPT FILE RVRMSG5.DAT

RWYID	36						
PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE
1	10	13	16	25	FFF	37	60+
2	02	14	18	26	60+	38	60+
3	03	15	18	27	60+	39	60+
4	03	16	22	28	60+	40	
5	04	17	22	29	60+	41	
6	04	18	22	30	60+	42	
7	10	19		31	60+	43	02
8	10	20		32	60+	44	50
9	10	21		33	60+	45	50
10	14	22		34	60+	46	55
11	14	23	FFF	35	60+	47	57
12	16	23	FFF	35	60+	47	57

4.5.1.2.1.4 Rvrmsg6.dat.

The Rvrmsg6.Dat file was designed to verify whether the entire range of RVR products would be properly displayed on ASOS and verify proper generation of RVR-related specials. For this file, a series of RVR products different from the previous files were used. For RVR products below the 2400 ft. threshold, RVRMSG6.DAT was configured to allow a different RVR product to be transmitted each minute. For products above 2400 ft., the same product was transmitted each minute until the final two minutes.

TABLE 4. RVRMSG6.DAT

RWYID	36L								
PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE
1	01	11	10	21	60+	31	60+	41	57
2	01	12	10	22	60+	32	60+	42	57
3	02	13	14	23	60+	33	60+		
4	02	14	14	24	60+	34	60+		
5	03	15	16	25	60+	35	60+		
6	03	16	16	26	60+	36	60+		
7	04	17	18	27	60+	37	60+		
8	04	18	18	28	60+	38	60+		
9	10	19	22	29	60+	39	50		
10	10	20	22	30	60+	40	50		

4.5.1.2.2 Rvrmsg7.dat

The Rvrmsg7.dat file was designed to verify how properly formatted, and non-numeric RVR products would be accounted for on ASOS display screens. To accomplish this, Rvrmsg7.dat contained a series of legal and typical RVR products followed by instances of non-numeric products not in accordance with the RVR-ASOS ICD.

TABLE 5. RVRMSG7.DAT

RWYID	36L								
PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE	PROD#	VALUE
1	01	7	04	13	07	19	(+	41	60+
2	01	8	04	14	07	20	(+	42	60+
3	02	9	05	15	08	21	(+		
4	02	10	05	16	08	22	(+		
5	03	11	06	17	(+	23	60+		
6	03	12	06	18	(+	24	60+		

4.5.1.2.3 OTHER SCRIPT FILES.

The Rvrmsg3.dat...Rvrmsg7.dat files were the basic script files used during testing. These files also formed the basis for other script files created to verify ASOS performance. For example, the runway identifier was modified in the Rvrmsg7.dat file to verify proper display of runway identifiers within and outside of specifications.

4.5.2 Operational Procedure Test.

The Operational Procedure Test consisted of two parts whereby typical and atypical operating system tasks were performed on the New Generation RVR System and ASOS. Paragraphs 4.5.2.1 and 4.5.2.2 provide further descriptions of the conducted tests.

4.5.2.1 Operational Procedure Test Part 1.

Operational Procedure Test Part 1 consisted of performing a subset of system tasks on the New Generation RVR and ASOS such as restarts, maintenance, configuration, and fault diagnosis. While these system tasks were performed, proper operation of non-RVR/ASOS related components, the RVR/ASOS Interface and ASOS were monitored for performance degradation and anomalies. The following categories of system tasks were performed during OT&E:

- a. Component restart/reset. For the New Generation RVR system, each sensor type; i.e., Visibility Sensor (VS), Ambient Light Sensor (ALS), Runway Light Intensity Monitor (RLIM), the DPU, and main processing units were restarted via MDT control. For ASOS, the ACU was restarted with hardware and software initialization procedures.
- b. System restart. Via the New Generation RVR MDT, system restarts were initiated for New Generation RVR hardware and software. System reinitialization was also performed on ASOS.
- c. Maintenance. The New Generation RVR system was configured for local control and sensor recalibration was performed. Additionally, MDT parameter display screens were exercised and examined for each sensor and the DPU. For ASOS, maintenance as described in the Site Technical and Software Users manual was performed.
- d. Fault diagnosis. Fault diagnostic tests were performed for each sensor and the New Generation RVR DPU. Results were examined for accuracy and completion. A related set of fault diagnosis procedures as described

in the Site Technical and Software Users manual was performed on the ASOS.

4.5.2.2 Operational Procedure Test Part 1 Objectives.

The objective of Operational Procedure Test Part 1 was to verify proper operation of New Generation and ASOS system tasks such as described in section 4.5.2.1. Additionally, this test was designed to confirm proper operation of the Interim RVR/ASOS Interface during execution of system tasks.

4.5.2.2.1 Operational Procedure Test Part 1 Setup.

Data collection devices, test equipment, and the RVR/ASOS interface were connected as shown in figure 4.5.2.2.1-1.

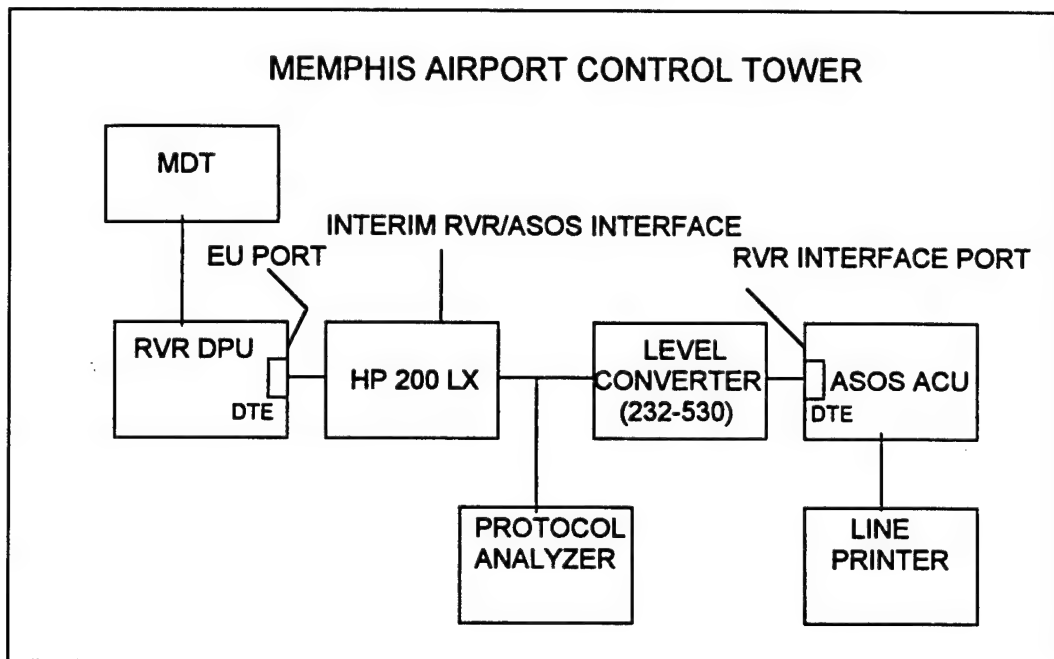


FIGURE 4.5.2.2.1-1. OPERATIONAL PROCEDURE TEST SETUP

4.5.2.3 Operational Procedure Test Part 2.

Operational Procedure Test Part 2 consisted of manipulating RVR sensor measurements on the VS, ALS, and RLIM to generate various RVR products within the ASOS ADU from the Interim RVR/ASOS Interface. Proper calculation of the RVR product was confirmed with stand-alone RVR calculation software. Agreement between the transmitted ASOS ADU and the RVR product displayed on ASOS was also confirmed for each transmitted product.

New Generation RVR VS measurements were manipulated with the aid of the calibration plate and foam plug. New Generation RVR ALS and RLIM measurements were manipulated by manually entering ALS and RLIM values via the MDT. Table 6 identifies the ambient light and runway light settings used as well as the expected RVR CD reading and ASOS reading.

4.5.2.3.1 Operational Procedure Test Part 2 Objectives.

The primary objective for part 2 of the Operational Procedure Test was to verify proper formation and transmission of ASOS ADUs from the Interim RVR/ASOS Interface after manipulation of RVR sensors. The test was also intended to confirm whether the transmitted ASOS ADU matched RVR products on all applicable ASOS display screens.

4.5.2.3.2 Operational Procedure Test Part 2 Setup.

Test setup for Operational Procedure Test Part 2 remained as shown in figure 4.5.2.2.1-1.

TABLE 6. RVR PRODUCT GENERATION SETTINGS

ALS (ft-lamberts)	RLIM EDGE/CENTER SETTING	VS EXTINCTION COEFFICIENT (km^{-1})	RVR PRODUCT (ft)	RVR @ASOS
2000	0	w/ cal plate hi	100	100
2000	3	w/ cal plate lo	300	300
2000	5	on field site	computed	
2000	5	w/ cal plate lo	400	400
2000	5	w/ plug	6500	6500
2000	5	sensor fail	FFF	FFF
6000	0	w/ cal plate hi	100	100
6000	3	w/ cal plate lo	200	200
6000	5	on field site	computed	
6000	5	w/ cal plate lo	200	200
6000	5	w/ plug	6500	6500
6000	5	sensor fail	FFF	FFF
12000	0	w/ cal plate hi	100	100
12000	3	w/ cal plate lo	200	200
12000	5	on field site	computed	
12000	5	w/ cal plate lo	300	300
12000	5	w/ plug	6500	6500
12000	5	sensor fail	FFF	FFF

4.5.3 Data Communication Failure Test.

The Data Communication Failure Test featured a simulation of various communication problems that could occur under operational conditions with the Interim RVR/ASOS Interface and ASOS. Simulated communication problems included erroneous block check codes, parity errors, baud rate conflicts, and cable disconnect. Interim RVR/ASOS Interface and ASOS performance were monitored during the existence of the communication problem as well as recovery from the communication problem.

4.5.3.1 Data Communication Failure Test Objectives.

The Data Communication Failure Test objective was to determine whether the Interim RVR/ASOS Interface and ASOS can properly recover and handle communication errors that may occur during operation. This included detection and notification of communication problems as well as notification of the removal of a communication problem.

4.5.3.2 Data Communication Failure Test Setup.

A PC based Data Communication Fault Simulator was connected to ASOS as shown in figure 4.5.3.2-1.

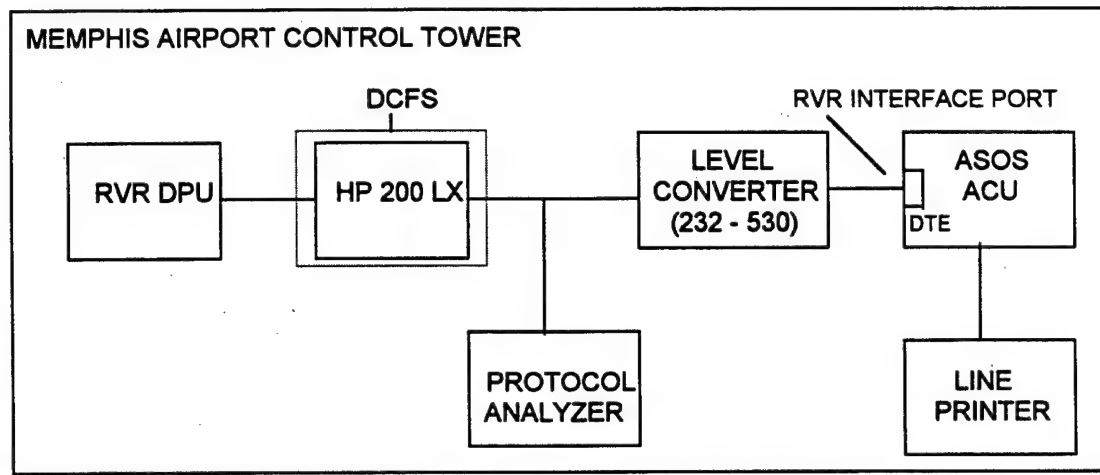


FIGURE 4.5.3.2-1. DATA COMMUNICATION FAILURE TEST SETUP

4.5.4 Extended Operation and Evaluation Test.

The Extended Operation and Evaluation Test consisted of configuring the New Generation RVR and ASOS to normal operating modes and allowing each system to function without operator intervention. Performance of the Interim RVR/ASOS Interface was then remotely monitored during naturally occurring weather conditions and maintenance for an extended period.

4.5.4.1 Extended Operation and Evaluation Test Objectives.

The objective of the Extended Operation and Evaluation Test was to verify proper performance of the Interim RVR/ASOS Interface for an extended time period at an operational site.

4.5.4.2 Extended Operation and Evaluation Test Setup.

Test setup remained as indicated in the Operational Procedure Test Part 2; however a protocol analyzer was not required, and as a result, not used.

4.6 DATA COLLECTION AND ANALYSIS METHODS.

For each test conducted data collection was accomplished through use of the following equipment and resources:

- a. Protocol analyzer;
- b. Test team observations -- test conduct forms will be used to record data from ASOS display screens and the RVR controller display; and
- c. ASOS printer -- to capture ASOS METAR reports and related display screens.
- d. DPU MDT -- to capture relevant DPU parameter and screens during testing.

Data analysis consisted primarily of reviewing the protocol analyzer data capture files to ensure proper format and content of ASOS ADUs transmitted from the Interim RVR/ASOS Interface. This analysis was performed after test sessions at MEM were concluded. ASOS ADU transmissions displayed on the protocol analyzer were also monitored during test sessions as part of planned test sequences.

5. OT&E REGRESSION TEST RESULTS.

This section discusses results for each test performed on the Interim RVR/ASOS Interface.

5.1 SIMULATED RVR TO ASOS TEST.

The Simulated RVR TO ASOS Test was conducted on January 21, 1997. Total test time was approximately 3 hours. Procedures were executed as specified in section A1 of the "New Generation RVR/ASOS Interface Operational Test and Evaluation Procedures" dated December 18, 1996.

RVR products output from the ASOS ADU generator were successfully confirmed as received and properly displayed on all applicable ASOS screens. ASOS Long-Line RVR readings were confirmed to contain RVR products contained in the ASOS ADU generator output. No TTRs were generated from testing.

5.2 OPERATIONAL PROCEDURE TEST PART 1.

Part 1 of the Operational Procedure Test was conducted on January 22, 1997. Total test execution time was approximately 4 hours. Although procedures were executed as specified in section A2 Part 1 of the New Generation RVR/ASOS Interface Test Procedures, some deviation in the test steps was required to coordinate test execution with the availability of MEM technicians.

Typical and atypical maintenance tasks such as restarts, system configuration, fault diagnosis, calibration, and MDT screen manipulation was performed with no significant adverse effect on Interim RVR/ASOS Interface performance. Although the Interim RVR/ASOS Interface performed satisfactorily throughout the test, three problems were noted. The problems, their potential impact, and ACT-320 recommendations are discussed in the following subparagraphs.

5.2.1 Problem: Off-Line Indication Not Sent During RVR Reset.

During a reset of the RVR Product Processing Unit (PPU), detection by the Interim RVR/ASOS software normally occurs and results in a sensor off-line indication or "FFF" being transmitted to ASOS. A test whereby the PPU was manually reset resulted in an apparent partial reset of the Interim RVR/ASOS Interface software.

The software reset was attributed to the momentary change in data output from the RVR External User (EU) port, which occurred during the PPU reset. The Interim RVR/ASOS software contains a function which is designed to detect and automatically adjust to changes in the EU data output size and interval. Execution of this function however, temporarily disables transmission of ADUs until the function has completed its execution.

If the Interim RVR/ASOS software reset period lasted longer than the RVR reset period, a sensor off-line message was not transmitted to ASOS. In fact, no data was transmitted to ASOS during the reset period. Instances where the Interim RVR/ASOS software reset period was shorter than the RVR reset resulted in detection and transmission of the expected sensor off-line message. This problem is documented as TTR 12 in appendix A.

5.2.1.1 Impact.

Periods where the cause of missing RVR data at ASOS display screens is not immediately apparent. Additional time may be required to determine the problem in instances where a PPU reset occurs and an off-line message is not transmitted to ASOS.

5.2.1.2 Recommendation.

In the event of RVR maintenance actions which may affect long-line RVR readings or its derivatives, NWS representatives should be contacted and advised of potential effects on RVR data at ASOS.

5.2.2 Problem: RVR System-Interim RVR/ASOS Interface Mismatch.

During tests where runway configuration changes were made at the RVR MDT, a mismatch between RVR system readings and ASOS application data units could be created by substituting another existing VS for the previously designated long-line VS. This resulted in a sensor off-line detection and transmission by the Interim RVR/ASOS Interface while numeric RVR readings were displayed at the RVR MDT and Controller Display. This problem is documented as TTR 13 in appendix A.

5.2.2.1 Impact.

This problem would impact timely maintenance of the RVR system in the event that the VS identified for long-line reporting was reconfigured with another on-line VS.

5.2.2.2 Recommendation.

NWS representatives should be contacted before performing RVR maintenance actions which may affect long-line RVR readings.

5.2.3 Problem: Watchdog Timer Reset Period.

Although the HP Palmtop Watchdog Timer properly detected non-operation of the RVR/ASOS software and initiated the reboot process, the detection and reboot sequence exceeded 3 minutes. The elapsed time caused ASOS to miss three consecutive ADUs. In accordance with ASOS weather product algorithms, any 10-minute period containing three or more missing ASOS ADUs results in ASOS reporting the long-line RVR² reading as missing. Therefore, because the Interim RVR/ASOS Interface Watchdog Timer needs more than 3 minutes for detecting software in-operation and reboot, ASOS may report a long-line RVR reading as missing or unavailable. This could result in up to 7 minutes of continuous RVR data not being reported by ASOS. This problem is documented as TTR 14 in appendix A.

²Long-Line RVR readings are defined as the 10-minute average of the designated touchdown RVR VS.

5.2.3.1 Impact.

In situations where the automatic reboot of Interim RVR/ASOS Interface software occurs, long-line RVR service could be disabled for longer periods of time than necessary.

5.2.3.2 Recommendation.

Although performance of the watch-dog timer is less than ideal, situations where reboots occur will be limited. Unless an alternative reboot process with a significantly shorter detection and reboot cycle can be developed, no further modifications are needed. However, this performance aspect of the interface should be noted for its intended users.

5.3 OPERATIONAL PROCEDURE TEST PART 2.

Part 2 of the Operational Procedure Test was conducted on January 22, 1997. Total test execution time was approximately 3 hours. Procedures were executed as specified in section A2 Part 2 of the New Generation RVR/ASOS Interface Test Procedures.

RVR products and ASOS ADUs were confirmed from the Interim RVR/ASOS Interface in response to manipulation of the New Generation RVR VS, ALS, and RLIM measurements. Proper calculation of the RVR product sent to ASOS was confirmed with RVR calculation software. Long-Line RVR products were confirmed as received and properly displayed on all applicable ASOS screens. Table 7 contains the results. No problems were observed during testing.

5.4 DATA COMMUNICATION FAILURE TEST.

The Data Communication Failure Test was conducted on January 23, 1997. Total elapsed test time was approximately 2 hours. Procedures were executed as specified in section A3 of the New Generation RVR/ASOS Interface Test Procedure document.

Parity and block check code errors between the Interim RVR/ASOS Interface and the ASOS were successfully generated during testing in addition to simulations of communication failure from cable disconnect. Misrepresentation of Long-Line RVR products on ASOS was not observed during these tests. In general, ASOS messages indicating a problem with RVR data or communication was observed for communication failure scenarios. One problem, discussed further in the following subparagraph, was noted during testing.

TABLE 7. OPERATIONAL PROCEDURE TEST OUTPUT

ALS (ft-lamberts)	RLIM EDGE/CENTER SETTING	VS EXTINCTION COEFFICIENT (km^{-1})	RVR PRODUCT (ft)	RVR @ASOS
2000	0	w/ cal plate hi	100	100
2000	3	w/ cal plate lo	300	300
2000	5	On field site	44,674 (60+)	60+
2000	5	w/ cal plate lo	400	400
2000	5	w/ plug	6500	6500
2000	5	Sensor fail	FFF	FFF
6000	0	w/ cal plate hi	100	100
6000	3	w/ cal plate lo	200	200
6000	5	on field site	54,602 (60+)	60+
6000	5	w/ cal plate lo	200	200
6000	5	w/ plug	6500	6500
6000	5	Sensor fail	FFF	FFF
12000	0	w/ cal plate hi	100	100
12000	3	w/ cal plate lo	200	200
12000	5	on field site	40,951 (60+)	60+
12000	5	w/ cal plate lo	300	300
12000	5	w/ plug	6500	6500
12000	5	sensor fail	FFF	FFF

5.4.1 Problem: Incorrect Display Of Runway Identifier.

During a simulation of communication failures between the Interim RVR/ASOS Interface and ASOS, a runway identifier which was not currently being transmitted to ASOS was momentarily displayed on the ASOS "1-MINUTE SCREEN". This runway identifier was also stored in the ASOS 5-minute archive file. Display of the proper runway identifier was automatically restored after a short period of time. No reoccurrence of the problem was observed during regression testing. This problem is documented as TTR 11 in appendix A.

5.4.1.1 Impact.

Unless corrected by an ASOS operator, this situation could result in the dissemination of incorrect long-line RVR readings to users. The lack of repeated occurrences of this problem during the test period suggests the problem might not be observed during typical operational circumstances.

5.4.1.2 Recommendation.

Analysis of the factors that could cause this situation to occur should be examined. Procedures where events are recreated to reproduce the problem should be implemented. A corrective modification to ASOS software should be made if a cause for the problem can be established.

5.5 EXTENDED OPERATION AND EVALUATION TEST.

The Extended Operation and Evaluation Test began on January 23, 1997. This test was designed to continue indefinitely unless problems related to the test developed with the New Generation RVR, HP Palmtop PC, or ASOS. OT&E preparation for the Final RVR/ASOS Interface concluded the Extended Operation and Evaluation Test in June of 1997. No problems were observed with Interim RVR/ASOS Interface performance during the period from January 1997, to June 1997.

6. CONCLUSIONS.

The Interim Runway Visual Range (RVR)/Automated Surface Observing System (ASOS) Interface passed all tests conducted during the test period. Of the 10 problems discovered during initial Operational Test and Evaluation (OT&E), 9 were shown to be resolved as a result of modifications to the Interim RVR/ASOS Interface and ASOS. Results also indicated that a maintenance procedure could be used to correct the remaining problem.

The correction and resolution of the problems identified during initial OT&E indicate that the Interim RVR/ASOS Interface and ASOS RVR functions are suitable for use in the field from an operational perspective. Proper performance demonstrated by the Interim RVR/ASOS Interface self-restart and illegal entry prevention features also indicate that the Interim RVR/ASOS Interface can be used with a minimum of maintenance actions by field technicians. These developments suggest the Interim RVR/ASOS Interface is prepared for use at designated long-line RVR sites.

7. RECOMMENDATIONS.

Although modifications to the Interim Runway Visual Range (RVR)/Automated Surface Observing System (ASOS) Interface have significantly improved its performance, additional documentation is needed for technicians who will be installing and periodically using the interface. To eliminate the need for formal training in the use or installation of the Interim RVR/ASOS Interface, an Instruction and Operational guide should be created for technicians/users of the interface.

ACT-320 recommends deployment of the Interim RVR/ASOS Interface for long-line RVR reporting. The Interim RVR/ASOS Interface should consist of the following components:

- a. Hewlett Packard Palmtop PC,
- b. Interim RVR/ASOS software,
- c. Custom serial RS-232 cables,
- d. Designated RS-232 to EIA-530 level converters, and
- e. Interim RVR/ASOS Instruction and Operational Guide.

8. ACRONYMS.

ACU	Acquisition Control Unit
ADAS	Automated Weather Observing System Data
ADU	Application Data Unit
ALS	Ambient Light Sensor
ASOS	Automated Surface Observing System
ATCT	Airport Traffic Control Tower
BCC	Block Check Code
CD	Controller Display
CSU	Channel Service Unit
DCE	Data Communication Equipment
DCFS	Data Communication Fault Simulator
DPU	Data Processing Unit
DQT	Design Qualification Testing
DSU	Data Service Unit
DTE	DATA Terminal Equipment
EIA	Electronic Industries Association
ETX	End of Transmission
EU	External User
FAA	Federal Aviation Administration
FSS	Flight Service Station
HP	Hewlett Packard
ICD	Interface Control Document
IMCS	Interim Monitoring and Control Software
IFR	Instrument Flight Rules
MB	Megabytes
MEM	Memphis International Airport
MDT	Maintenance Data Terminal
METAR	Aviation Routine Weather Report
MPS	Maintenance Processor System
NAS	National Airspace System
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OT&E	Operational Test and Evaluation
PC	Personal Computer
PPU	Product Processing Unit
RLIM	Runway Light Intensity Monitor
RMM	Remote Maintenance Monitoring
RVR	Runway Visual Range
RS	Recommended Standard
SAO	Surface Aviation Observation
TRACON	Terminal Radar Approach Control
TTR	Test Trouble Report
VS	Visibility Sensor

APPENDIX A
TEST TROUBLE REPORTS

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-11	
DATE: 01/21/97		TIME: 1620		SITE: MEMPHIS	
				STATUS: OPEN	
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input type="checkbox"/>	ASOS DISPLAY	<input checked="" type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED:					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID: 4.4.3					
TEST PROCEDURE ID: A.3-16 STEP(S): 38 - 43					
DESCRIPTION OF ISSUE/PROBLEM: "INCORRECT DISPLAY OF RUNWAY IDENTIFIER"					
<p>The Data Communication Failure Test began with the Interim RVR/ASOS Interface (HP Palmtop) configured to initially transmit a runway identifier of "23C". During the test, the runway identifier was changed to "36L". After the simulation of approximately three minutes of block check code errors, the ASOS "ONE MINUTE SCREEN" momentarily displayed "R23C/P6000ft" and then refreshed the screen with "RVRNO". During the period which the "R23C/P6000ft" was displayed, the HP Palmtop continued to transmit a runway identifier of "36L". The 5-min archive log recorded the change in runway identifier as displayed to the observers. See printout on the following pages.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.45					
INTERIM RVR/ASOS SOFTWARE ID: 01/02/97					
Doug Gifford (NSB)				01/21/97	
ISSUE/PROBLEM WITNESS				DATE	
Michael Jones and John Crovo				01/21/97	
FAA TEST DIRECTOR/REPRESENTATIVE				DATE	
Peggy Hoch				01/21/97	
NWS REPRESENTATIVE NSB				DATE	
Wendell Cook				01/21/97	
NOAA REPRESENTATIVE				DATE	

ASOS OID Printout follows:

16:15:04 01/21/97 2215Z

MEMPHIS INTERNATIONAL ARPT

UTC	VIS1	D/N1	VIS2	D/N2	VIS3	D/N3	WIND	DIR/SPD	5SEC	WIND	RVR
2149	0.050	D			0.050	D	186	11	187	13	23C60+
2150	0.050	D			0.052	D	186	12	181	14	23C60+
2151	0.050	D			0.052	D	186	12	188	12	36L60+
2152	0.050	D			0.050	D	185	10	181	10	36L60+
2153	0.050	D			0.050	D	184	10	176	11	36L60+
2154	0.050	D			0.050	D	186	10	188	10	36L60+
2155	0.050	D			0.050	D	187	10	190	10	36L60+
2156	0.050	D			0.050	D	186	9	187	10	36L60+
2157	0.050	D			0.050	D	183	9	180	10	36L60+
2158	0.050	D			0.050	D	182	9	193	9	36L60+
2159	0.050	D			0.050	D	184	8	181	9	M
2200	0.050	D			0.050	D	183	9	184	10	M

12 HR ARCHIVE

ASOS OID Printout follows:

16:15:28 01/21/97 2215Z

MEMPHIS INTERNATIONAL ARPT

01/21/97 15:40:31 5-MIN KMEM 212140Z 19015KT 10SM R23C/P6000FT FEW110
18/06 A3008 190 44 600 190/15 RMK A02
01/21/97 15:45:31 5-MIN KMEM 212145Z 19013G21KT 10SM R23C/P6000FT SCT110
18/06 A3008 190 44 600 190/13G21 RMK A02
01/21/97 15:50:31 5-MIN KMEM 212150Z 19012KT 10SM R23C/P6000FT BKN110
18/06 A3007 190 44 600 190/12 RMK A02 SLPNO T01780056
01/21/97 15:55:31 5-MIN KMEM 212155Z 19010KT 10SM R36L/P6000FT BKN110
18/06 A3007 190 44 600 190/10 RMK A02 SLPNO T01780056
01/21/97 16:00:31 5-MIN KMEM 212200Z 18009KT 10SM R23C/P6000FT BKN110
18/06 A3007 190 44 600 180/09 RMK A02
01/21/97 16:05:31 5-MIN KMEM 212205Z 18009KT 10SM OVC110 18/06 A3007 190
44 600 180/09 RMK A02
01/21/97 16:10:31 5-MIN KMEM 212210Z 18010KT 10SM OVC110 18/06 A3007 190
44 600 180/10 RMK A02

REVIEW 5 MINUTE

ASOS OID Printout follows:

16:17:10 01/21/97 2217Z

MEMPHIS INTERNATIONAL ARPT

01/21/97 14:51:20 PMH LOGGED OFF AS OBSERVER FROM OID#1
01/21/97 14:56:26 TESTM KMEM 212056Z AUTO 20016KT 3/4SM R36/2200V2600FT HZ
CLR 18/03 A3008 RMK A02 SLPNO VISIBILITY IS TEST VALUE. T01830033 56026
TSNO

01/21/97 15:03:26 TESTS KMEM 212103Z AUTO 19018G22KT 10SM R36/2200V2600FT
CLR 18/04 A3008 RMK A02 TSNO
01/21/97 15:04:23 PMH LOGGED ON AS OBSERVER FROM OID#1
01/21/97 15:12:26 TESTS KMEM 212112Z 19017KT 1 1/2SM R36/2200V2600FT HZ
CLR 18/04 A3008 RMK A02 (PMH)
01/21/97 15:38:26 TESTS KMEM 212138Z 19016KT 10SM FEW110 18/06 A3008 RMK
A02 (PMH)
01/21/97 15:56:26 TESTM KMEM 212156Z 19009KT 10SM BKN110 18/06 A3007 RMK
A02 SPLNO T01780056 (PMH)

REVIEW OBSERVATION

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-12	
DATE: 01/22/97		TIME: 0925		SITE: MEMPHIS	
				STATUS: OPEN	
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY	<input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED:					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID: 4.4.2					
TEST PROCEDURE ID: A.2			STEP(S): 54		
DESCRIPTION OF ISSUE/PROBLEM: "SENSOR OFF-LINE INDICATION NOT SENT DURING RVR RESET"					
<p>After manual reset of the RVR PPU, a sensor off-line or transmission of "FFF" was expected by the HP Palmtop. It was observed that an off-line indication was not generated for every PPU reset which occurred. For some PPU resets, the HP Palmtop was observed to partially reset or re-acknowledge data frame sizes from the RVR External User port. When the time taken for the HP Palmtop to partially reset exceeded the RVR PPU reset, no off-line indication was generated for ASOS. For instances which the HP Palmtop reset completed before the RVR PPU reset, a sensor off-line message was generated. Therefore, generation of the off-line message appeared to be dependent on the coincidence of reset intervals for the HP Palmtop and RVR system.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.45					
INTERIM RVR/ASOS SOFTWARE ID: 01/02/97					
Michael Jones				01/21/97	
ISSUE/PROBLEM WITNESS				DATE	
Michael Jones and John Crovo				01/21/97	
FAA TEST DIRECTOR/REPRESENTATIVE				DATE	
Peggy Hoch				01/21/97	
NWS REPRESENTATIVE (NSB)				DATE	
Wendell Cook				01/21/97	
NOAA REPRESENTATIVE				DATE	

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-13	
DATE: 01/22/97		TIME: 1106		SITE: MEMPHIS	
				STATUS: OPEN	
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input checked="" type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY	<input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED: LAPTOP PC					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID: 4.4.2					
TEST PROCEDURE ID: A.2		STEP(S): 62			
DESCRIPTION OF ISSUE/PROBLEM: "RVR SYSTEM-INTERIM RVR/ASOS					
INTERFACE MISMATCH"					
During tests where runway configuration changes were made at the RVR MDT, it was found that a mismatch between RVR system readings and ASOS application data units could be created by substituting other existing visibility sensors (VS) for the previously designated long-line VS. This resulted in a sensor off-line detection and transmission by the Interim RVR/ASOS Interface although a sensor off-line indication was not indicated by the RVR system.					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.45					
INTERIM RVR/ASOS SOFTWARE ID: 01/02/97					
Michael Jones			01/21/97		
<i>ISSUE/PROBLEM WITNESS</i>			<i>DATE</i>		
Michael Jones and John Crovo			01/21/97		
<i>FAA TEST DIRECTOR/REPRESENTATIVE</i>			<i>DATE</i>		
Peggy Hoch			01/21/97		
<i>NWS REPRESENTATIVE (NSB)</i>			<i>DATE</i>		
Wendell Cook			01/21/97		
<i>NOAA REPRESENTATIVE</i>			<i>DATE</i>		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-14	
DATE: 01/22/97		TIME: approx. 1300		SITE: MEMPHIS	
STATUS: OPEN					
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY	<input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED: LAPTOP PC					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID: 4.4.2					
TEST PROCEDURE ID: A.2			STEP(S): 67		
DESCRIPTION OF ISSUE/PROBLEM: "WATCHDOG TIMER RESET PERIOD"					
<p>The time elapsed during the Interim RVR/ASOS Interface non-operation detection and reboot periods exceeds a three minute operating interval at ASOS. The ASOS weather product algorithms "75% rule" as applied to long-line RVR reporting, requires at least eight minutes of acceptable RVR sensor data during the most recent ten-minute period. For the RVR/ASOS interface non-operation detection and reboot period > 3 min. and < 4 min., there is thus a period of eight or nine minutes that ASOS will report no RVR information.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.45					
INTERIM RVR/ASOS SOFTWARE ID: 01/02/97					
Michael Jones				01/21/97	
ISSUE/PROBLEM WITNESS				DATE	
Michael Jones and John Crovo				01/21/97	
FAA TEST DIRECTOR/REPRESENTATIVE				DATE	
Peggy Hoch				01/21/97	
NWS REPRESENTATIVE (NSB)				DATE	
Wendell Cook				01/21/97	
NOAA REPRESENTATIVE				DATE	

INITIAL OT&E TEST TROUBLE REPORTS WITH STATUS

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-001	
DATE: 10/22/96		TIME: 1523CDT		SITE: MEMPHIS	
STATUS: CLOSED					
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input type="checkbox"/>	ASOS DISPLAY	<input checked="" type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED:					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER: ASOS ADU Generator (RVR simulator) using the "RVRMSG4.DAT" file.					
TEST PLAN ID: 4.4.1					
TEST PROCEDURE ID: A.1.8			STEP(S): 23		
DESCRIPTION OF ISSUE/PROBLEM: "ASOS Display Screen Mismatch with RVR Product"					
<p>An ASOS Application Data Unit (ADU) containing a runway number without an identifier (e.g., R, L, C) and a RVR product was transmitted to ASOS from the ASOS ADU generator (RVR simulator). The ASOS "12 HOUR ARCHIVE SCREEN" correctly displayed the RVR product as transmitted--"26 26", however the ASOS "ONE MINUTE DATA" screen displayed the RVR product as "2626". Although no runway identifier was transmitted, the ASOS ONE MINUTE DATA screen was expected to display the RVR product as it was transmitted--"26 26". The METAR (Aviation Routine Weather Report) generated during the above period correctly displayed the RVR product without a runway identifier and extraneous spaces.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: N/A					
ASOS SOFTWARE VERSION ID: 2.44					
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96					
K.P. Kuzo			10/22/96		
ISSUE/PROBLEM WITNESS			DATE		
Michael Jones			10/22/96		
FAA TEST DIRECTOR/REPRESENTATIVE			DATE		
Doug Gifford			10/22/96		
NWS REPRESENTATIVE			DATE		
Wendell A. Cook			10/22/96		
NOAA REPRESENTATIVE			DATE		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-002
DATE: 10/21/96	TIME: 1:00	SITE: MEMPHIS	STATUS: CLOSED	
SYSTEMS/COMPONENTS IN ISSUE:				
RVR DPU <input type="checkbox"/>	RVR MDT <input type="checkbox"/>	ASOS ACU <input type="checkbox"/>		
RVR SIE <input type="checkbox"/>	INTERIM INTERFACE <input checked="" type="checkbox"/>	ASOS DISPLAY <input type="checkbox"/>		
RVR CD <input type="checkbox"/>	FINAL INTERFACE <input type="checkbox"/>	MPS <input type="checkbox"/>		
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input type="checkbox"/>				
OTHER: None.				
TEST PLAN ID:				
TEST PROCEDURE ID:				
STEP(S):				
DESCRIPTION OF ISSUE/PROBLEM: "INTERIM RVR/ASOS INTERFACE BOOT FAILURE"				
During the boot/start-up process of the Interim RVR/ASOS Interface (HP Palmtop PC), the ASOS ADU software did not automatically start as required, even though start and initialization programs such as "autoexec.bat", "stacker", and "asosnov.exe" appeared to be initiated and properly configured on the flash ram card (drive "a:\"). Since the boot process ended with initialization of the "c:\\" drive, it appeared that the HP Palmtop was not booting from the flash ram card, but rather, the c:\ drive.				
NEW GENERATION RVR SOFTWARE VERSION ID: N/A				
ASOS SOFTWARE VERSION ID: N/A				
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96				
Michael Jones		10/21/96		
<i>ISSUE/PROBLEM WITNESS</i>		<i>DATE</i>		
Michael Jones		10/23/96		
<i>FAA TEST DIRECTOR/REPRESENTATIVE</i>		<i>DATE</i>		
Doug Gifford		10/23/96		
<i>NWS REPRESENTATIVE</i>		<i>DATE</i>		
Wendell A. Cook		10/23/96		
<i>NOAA REPRESENTATIVE</i>		<i>DATE</i>		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-003	
DATE: 10/23/96		TIME: 1546		SITE: MEMPHIS	
				STATUS: CLOSED	
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY	<input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED:					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID: 4.4.2					
TEST PROCEDURE ID: A.2.8			STEP(S): 31		
DESCRIPTION OF ISSUE/PROBLEM: "INTERIM RVR/ASOS SOFTWARE LOCK UP"					
<p>The ASOS ADU software failed to operate after a hardware and software restart of the HP Palmtop PC. The program accepted operator entries for the runway number, visibility sensor (VS) and transmission rate but stopped execution where the acknowledgment of data frames from the New Generation RVR system normal occurs. Attempts were made to end the program by entering "Ctrl-C" but keystroke entries were not accepted. Attempts to reboot the HP Palmtop PC hardware and software ("Ctrl-Alt-Del" and "Ctrl-Alt-^") were also made but were unsuccessful.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.44 (ACU)					
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96					
John Crovo			10/23/96		
ISSUE/PROBLEM WITNESS			DATE		
Michael Jones			10/23/96		
FAA TEST DIRECTOR/REPRESENTATIVE			DATE		
Doug Gifford			10/23/96		
NWS REPRESENTATIVE			DATE		
Wendell Cook			10/23/96		
NOAA REPRESENTATIVE			DATE		

RVR/ASOS INTERFACE TEST TROUBLE REPORT			TTR-004
DATE: 10/23/96	TIME: 1715	SITE: MEMPHIS	STATUS: CLOSED
SYSTEMS/COMPONENTS IN ISSUE:			
RVR DPU <input type="checkbox"/>	RVR MDT <input type="checkbox"/>	ASOS ACU <input type="checkbox"/>	
RVR SIE <input type="checkbox"/>	INTERIM INTERFACE <input checked="" type="checkbox"/>	ASOS DISPLAY <input type="checkbox"/>	
RVR CD <input type="checkbox"/>	FINAL INTERFACE <input type="checkbox"/>	MPS <input type="checkbox"/>	
TEST EQUIPMENT USED:			
PROTOCOL ANALYZER <input checked="" type="checkbox"/>			
OTHER:			
TEST PLAN ID:			
TEST PROCEDURE ID: A.2.8		STEP(S): 31	
DESCRIPTION OF ISSUE/PROBLEM: "RVR Output Rate with Interim RVR/ASOS Software"			
<p>The ASOS ADU software would not consistently operate with several RVR EU output rates. The initial test used an EU output rate of 2 seconds. After performing restarts and entering site specific parameters (i.e., runway identifier, VS, etc.), execution of ASOS ADU software began as expected, but ASOS ADUs were not transmitted to ASOS. Additionally, it was noted that the acknowledgment of RVR EU data frames was not occurring at the palmtop as in normal operation. The aforementioned problems were observed with two different HP Palmtops and separate installations of the ASOS ADU software. For each of the EU output rates, multiple restarts were performed for the HP Palmtop hardware and software and the ASOS ADU software was executed again. The problem continued without change for the 2, 4 and 6 second output rates. The problem was seen initially using a 10 second rate; however, after several restarts the palmtop appeared to operate normally.</p>			
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)			
ASOS SOFTWARE VERSION ID: 2.44			
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96			
Michael Jones		10/23/96	
ISSUE/PROBLEM WITNESS		DATE	
Michael Jones		10/23/96	
FAA TEST DIRECTOR/REPRESENTATIVE		DATE	
Doug Gifford		10/23/96	
NWS REPRESENTATIVE		DATE	
Wendell A. Cook		10/23/96	
NOAA REPRESENTATIVE		DATE	

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-005	
DATE: 10/21/96		TIME: 19:15		SITE: MEMPHIS	
STATUS: CLOSED					
SYSTEMS/COMPONENTS IN ISSUE:					
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU	<input type="checkbox"/>
RVR SIE	<input checked="" type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY	<input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS	<input type="checkbox"/>
TEST EQUIPMENT USED:					
PROTOCOL ANALYZER <input checked="" type="checkbox"/>					
OTHER:					
TEST PLAN ID:					
TEST PROCEDURE ID: A2.1.8 STEP(S): 58					
DESCRIPTION OF ISSUE/PROBLEM: "PHANTOM RVR PRODUCTS WITH RVR CONFIGURATION MODIFICATIONS"					
<p>During a runway configuration change at the RVR Maintenance Data Terminal (MDT), the ASOS ADU software was allowed to continually operate. After unconfiguring the runway designated for long-line RVR reporting, ASOS ADUs from the HP Palmtop PC were observed. After the configuration change, the RVR CD reported "FFF" for the runway identifier and the long-line RVR VS. During the same period, the ASOS ADU software reported RVR products (e.g., "36L39") that did not actually exist, and also reported products containing randomly generated ASCII characters such as "36L.+" and "36L)++".</p> <p>Although the ASOS 12 HOUR ARCHIVE SCREEN displayed all of the RVR products as they were transmitted by the HP Palmtop PC, the ASOS ONE MINUTE DATA SCREEN rejected RVR products containing ASCII characters and replaced them with the symbol "M" for missing RVR product. False RVR products such as the 36L39 were displayed as normal RVR products by ASOS.</p>					
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)					
ASOS SOFTWARE VERSION ID: 2.44					
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96					
Michael Jones			10/23/96		
ISSUE/PROBLEM WITNESS			DATE		
Michael Jones			10/23/96		
FAA TEST DIRECTOR/REPRESENTATIVE			DATE		
Doug Gifford			10/23/96		
NWS REPRESENTATIVE			DATE		
Wendell Cook			10/23/96		
NOAA REPRESENTATIVE			DATE		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-006
DATE: 10/24/96		TIME: 2100	SITE: Memphis	STATUS: OPEN
SYSTEMS/COMPONENTS IN ISSUE:				
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input type="checkbox"/>	ASOS DISPLAY
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input type="checkbox"/>				
OTHER:				
TEST PLAN ID: 4.4.2				
TEST PROCEDURE ID:		STEP(S):		
DESCRIPTION OF ISSUE/PROBLEM: "False RVR Products During RVR Sensor Calibration"				
<p>During tests involving the calibration of the long-line VS, it was noted that the calibration values were sent to ASOS as legitimate RVR products. The calibration procedure as defined in the RVR On-Site Requirements manual was followed. If the maintenance technician remains logged off of the VS while the calibration plate is installed for longer than seven minutes, the ASOS will most likely generate a long-line "special" message containing invalid (calibration) data. Maintenance procedures and/or software enhancements may be required to prevent transmission of calibration data from the RVR DPU to ASOS. See attached printout.</p>				
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)				
ASOS SOFTWARE VERSION ID: 2.44				
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96				
Doug Gifford		10/24/96		
<i>ISSUE/PROBLEM WITNESS</i>		<i>DATE</i>		
Michael Jones		10/24/96		
<i>FAA TEST DIRECTOR/REPRESENTATIVE</i>		<i>DATE</i>		
Doug Gifford		10/24/96		
<i>NWS REPRESENTATIVE</i>		<i>DATE</i>		
Wendell Cook		10/24/96		
<i>NOAA REPRESENTATIVE</i>		<i>DATE</i>		

ASOS OID Printout follows:

08:51:29 10/24/96 1415Z

*** HOURLY ***

MEMPHIS INTERNATIONAL ARPT

UTC	VIS1	D/N1	VIS2	D/N2	VIS3	D/N3	WIND	DIR/SPD	5SEC	WIND	RVR
1436	0.089	D			0.050	D	127	2	144	2	36LFFF
1437	0.076	D			0.050	D	136	2	155	2	36LFFF
1438	0.065	D			0.050	D	134	2	115	3	36L04*
1439	0.072	D			0.050	D	121	2	124	3	36L04*
1440	0.073	D			0.050	D	124	3	135	4	36LFFF*
1441	0.074	D			0.050	D	137	4	142	4	36L04*
1442	0.069	D			0.050	D	136	4	128	4	36L02*
1443	0.068	D			0.053	D	130	4	123	4	36L01*
1444	0.070	D			0.051	D	132	4	139	5	36LFFF*
1445	0.072	D			0.050	D	131	4	118	4	36L01*
1446	0.066	D			0.050	D	131	4	135	4	36L03*
1447	0.060	D			0.050	D	132	4	128	5	36L60+*

12HR ARCHIVE

*NOTE: These calibration values could have resulted in a long-line transmission containing RVR report R36L/0100VP600FT

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-007
DATE: 11/24/96		TIME: 12:30		SITE: MEMPHIS
STATUS: CLOSED				
SYSTEMS/COMPONENTS IN ISSUE:				
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input type="checkbox"/>				
OTHER:				
TEST PLAN ID:				
TEST PROCEDURE ID:		STEP(S):		
DESCRIPTION OF ISSUE/PROBLEM: "MISSING DEFAULT PARAMETERS FOR ASOS				
ADU"				
Each restart of the ASOS ADU software requires operator entry of runway number, VS and transmission rate. The ASOS ADU software has no capability to determine if properly formatted entries by the operator are accurate. Tests where correctly formatted but nonexistent VS numbers have resulted in randomly generated ASCII values for RVR products to be sent to ASOS.				
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)				
ASOS SOFTWARE VERSION ID: 2.44				
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96				
Michael Jones		10/24/96		
<i>ISSUE/PROBLEM WITNESS</i>		<i>DATE</i>		
Michael Jones		10/24/96		
<i>FAA TEST DIRECTOR/REPRESENTATIVE</i>		<i>DATE</i>		
Doug Gifford		10/24/96		
<i>NWS REPRESENTATIVE</i>		<i>DATE</i>		
Wendell Cook		10/24/96		
<i>NOAA REPRESENTATIVE</i>		<i>DATE</i>		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-008
DATE: 10/24/96		TIME: 2:40	SITE: MEMPHIS	STATUS: OPEN
SYSTEMS/COMPONENTS IN ISSUE:				
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU <input checked="" type="checkbox"/>
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input type="checkbox"/>	ASOS DISPLAY <input type="checkbox"/>
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS <input type="checkbox"/>
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input type="checkbox"/>				
OTHER:				
TEST PLAN ID:				
TEST PROCEDURE ID:		STEP(S):		
DESCRIPTION OF ISSUE/PROBLEM: "UNEXPECTED ASOS WARM BOOT DURING COMMUNICATION FAILURE."				
<p>While data communication failures (parity errors) were being simulated via the HP Palmtop PC, an attempt was made to clear a failure condition for the ASOS RVR interface--the Serial Input/Output card configured for the RVR interface. Unexpectedly, ASOS initiated a warm reboot. The ASOS operator was signed on as technician [MAINT-SEL-VME Cards Rack - SEL - SIO #1 - SEL - CLEAR]. An attempt was made to clear the SIO #1 failure" on the "VME Cards Screen". Before the warm boot was observed, the ASOS operator had cleared the failure count on the ACU SIO by pressing the clear key. The failure count on port 3 was observed to disappear.</p>				
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)				
ASOS SOFTWARE VERSION ID: 2.44				
Rich Bunevitch		10/24/96		
ISSUE/PROBLEM WITNESS		DATE		
Michael Jones		10/24/96		
FAA TEST DIRECTOR/REPRESENTATIVE		DATE		
Doug Gifford		10/24/96		
NWS REPRESENTATIVE		DATE		
Wendell Cook		10/24/96		
NOAA REPRESENTATIVE		DATE		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-009
DATE: 10/24/96		TIME:	SITE: MEM	STATUS: CLOSED
SYSTEMS/COMPONENTS IN ISSUE:				
RVR DPU	<input type="checkbox"/>	RVR MDT	<input type="checkbox"/>	ASOS ACU
RVR SIE	<input type="checkbox"/>	INTERIM INTERFACE	<input checked="" type="checkbox"/>	ASOS DISPLAY
RVR CD	<input type="checkbox"/>	FINAL INTERFACE	<input type="checkbox"/>	MPS
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input type="checkbox"/>				
OTHER:				
TEST PLAN ID:				
TEST PROCEDURE ID: A2		STEP(S): 31		
DESCRIPTION OF ISSUE/PROBLEM: "HP PALMTOP OPERATING SYSTEM SHUTDOWN"				
Operation of the ASOS ADU software was halted by pressing "Ctrl-c". After acknowledging the system prompt to stop execution of the ASOS ADU batch file, a memory allocation error occurred and a "SYSTEM HALTED" message was displayed. Operation of the HP Palmtop operating system was halted. A reboot was initiated to reset the HP Palmtop PC.				
NEW GENERATION RVR SOFTWARE VERSION ID: 4.1 (NDB + 1)				
ASOS SOFTWARE VERSION ID: 2.44				
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96				
Michael Jones		10/24/96		
<i>ISSUE/PROBLEM WITNESS</i>		<i>DATE</i>		
Michael Jones		10/24/96		
<i>FAA TEST DIRECTOR/REPRESENTATIVE</i>		<i>DATE</i>		
Doug Gifford		10/24/96		
<i>NWS REPRESENTATIVE</i>		<i>DATE</i>		
Wendell Cook		10/24/96		
<i>NOAA REPRESENTATIVE</i>		<i>DATE</i>		

RVR/ASOS INTERFACE TEST TROUBLE REPORT				TTR-10
DATE: 10/23/96		TIME: 10:00AM CDT	SITE: Memphis	STATUS: CLOSED
SYSTEMS/COMPONENTS IN ISSUE:			LEVEL CONVERTER <input checked="" type="checkbox"/>	
RVR DPU <input type="checkbox"/>	RVR MDT <input type="checkbox"/>	ASOS ACU <input checked="" type="checkbox"/>		
RVR SIE <input type="checkbox"/>	INTERIM INTERFACE <input checked="" type="checkbox"/>	ASOS DISPLAY <input type="checkbox"/>		
RVR CD <input type="checkbox"/>	FINAL INTERFACE <input type="checkbox"/>	MPS <input type="checkbox"/>		
TEST EQUIPMENT USED:				
PROTOCOL ANALYZER <input checked="" type="checkbox"/>				
OTHER:				
TEST PLAN ID: 4.4.2				
TEST PROCEDURE ID: A.2. STEP(S):				
DESCRIPTION OF ISSUE/PROBLEM: "POWERED vs. NON-POWERED LEVEL CONVERTERS"				
<p>During test setup it was noted that ASOS ADU transmissions from the HP Palmtop PC could not be viewed on the protocol analyzer if the non-powered (receives power from the data transmission devices) RS-232 to EIA-530 level converters were used with the New Generation RVR and ASOS. Successful operation of the non-powered level converters was noted if the protocol analyzer was removed from the circuit and a direct connection made to the HP Palmtop PC and ASOS. Additionally, operation of the non-powered level converters was successful with the RVR simulation program, protocol analyzer and the ASOS.</p> <p>No discrepancies were noted in the operation of the powered (receives power from a separate AC adapter) level converters throughout testing.</p>				
NEW GENERATION RVR SOFTWARE VERSION ID: N/A				
ASOS SOFTWARE VERSION ID: N/A				
INTERIM RVR/ASOS SOFTWARE ID: 7/2/96				
Michael Jones		10/31/96		
ISSUE/PROBLEM WITNESS		DATE		
Michael Jones		10/31/96		
FAA TEST DIRECTOR/REPRESENTATIVE		DATE		
Doug Gifford				
NWS REPRESENTATIVE		DATE		
Wendell Cook				
NOAA REPRESENTATIVE		DATE		